SECTION 5
SERVICE

5.1 GENERAL

This section provides calibration, troubleshooting, and removal and replacement instructions for the Model C100 and C200 Incubators.

IMPORTANT: It should be noted that the terms "SET TEMP" and "SET POINT" are used interchangeably in this manual.

5.2 CALIBRATION PROCEDURES

5.2.1 GENERAL

This paragraph provides calibration procedures for the Controllers and tests for the Incubator.

Unless otherwise indicated, all calibration procedures are performed under the following conditions:

1. The Controller is removed from the Incubator and the cover is removed.
2. The Controller is connected to a primary source of the correct voltage and frequency.
3. Primary power applied to the Controller for a minimum of ten minutes before calibrating.

5.2.2 TEST EQUIPMENT REQUIRED

The test equipment listed below is required for calibration of the Controller and performing Oxygen Concentration tests. Equivalent test equipment may be substituted.

- Probe Simulator, Part No. 68 900 80
- Logic Probe – capable of +/– 12 Vdc
- Variable Transformer, General Radio Model WSM T3AW
- Digital VOM, Fluke Model 8060A
- Oxygen Analyzer, Sybron/Taylor Model QA580
- Flowmeter, Victor – Model 1099–0025
- Leakage Current Tester, Bio–Tek 501

5.2.3 PCB2 – MODEL C100

TEST SETUP

1. Connect the Simulator to the PATIENT PROBE and AUXILIARY PROBE jacks on the Side Panel of the Controller. Connect the ac line cord through a variac and turn on the unit. Set the variac as follows: 120 +/– 2V~ (110/120V Models); 240 +/– 2V~ (220/240V Models); 100 +/– 2V~ (100V Models).
2. On the Controller, set the AIR and SKIN set Temp. switches to 36.0 °C. Set the CONTROL MODE switch to AIR.
3. On the Simulator, set the MODE switch to AIR and the TEMP switch to 36 °C. Refer to Figure 5.1 for location of test points and adjustments.

PROCEDURE

1. Refer to Figure 5.1 and connect the DVM between TP20 (+) and TP22 on PCB2.
2. Adjust R35 on PCB2 for a reading of –350 +/– 50 mV on the DVM.
3. On the Simulator, set the MODE switch to SKIN. Connect the DVM between TP13 (+) and TP22.
4. Adjust R50 for a reading of –350 +/– 50 mV on the DVM.
5. Turn off the POWER switch on the Controller. Connect the logic probe between +12 Vdc and ground. Monitor TP15 with the logic probe.
6. Turn the unit on. Set the variac as follows: 95 +/– 2V~ (110/120V Models); 190 +/– 2V~ (220/240V Models); 80 +/– 2V~ (100V Models). On PCB2, turn R100 fully counterclockwise.

6a. On the simulator, set the mode switch to AIR.

7. On the Controller, set the AIR SET TEMP Switch to 37 °C. Slowly turn R100 clockwise until the light on the logic probe just stays off constantly (full heater power).

7a. Set the variac as follows: 130 +/– 2 VAC (110/120V Models); 260+/– 2 VAC (220/240V Models); 108+/– 2 VAC (100V Models). The light on the logic probe should be on for approximately 50 percent of the time.

8. Set the variac as follows: 120 +/– 2V~ (110/120V Models); 240 +/– 2V~ (220/240V Models); 100 +/– 2V~ (100V Models). The light should go off for approximately four seconds (Heater On) and come on for approximately two seconds (Heater Off).
9. Turn off the Power. Remove the logic probe.

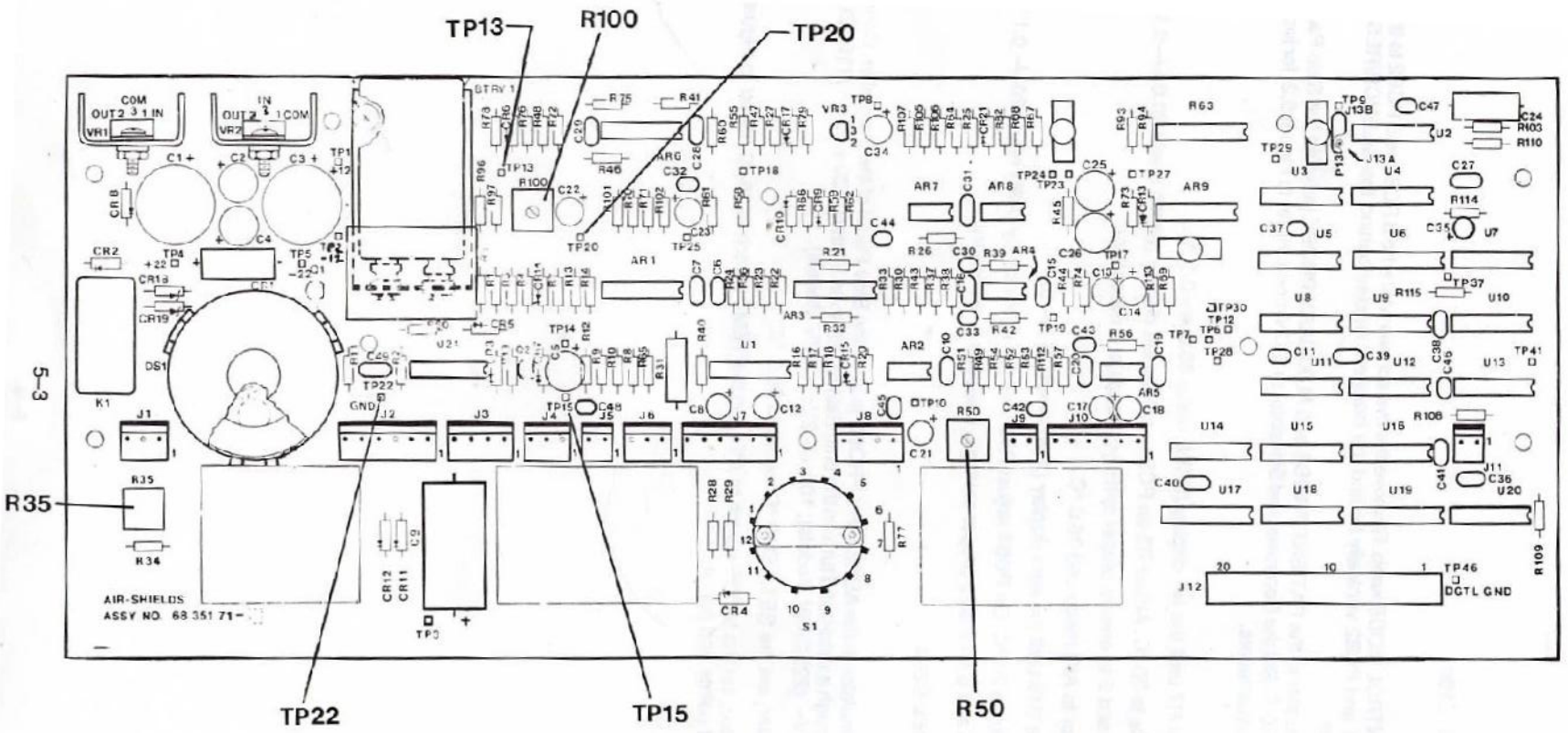

FIGURE 5.1 PCB2 (MODEL C100), LOCATION OF TEST POINTS AND ADJUSTMENTS

5.2.4 PCB1 – MODEL C100

TEST SETUP

1. Remove the CONTROL MODE knob. Remove the five screws which hold PCB1 and PCB2 to the Front Panel. Set PCB1 and PCB2 vertically behind the brackets located behind the SILENCE/RESET and POWER switches.
2. Connect the Simulator to the PATIENT PROBE and AUXILIARY PROBE jacks on the Side Panel. Set the Simulator to 36°C. Set the Controller and Simulator to SKIN mode. Refer to Figure 5.2. for location of test points and adjustments.

PROCEDURE

1. On PCB1, adjust R7 until the left display (SKIN) reads 36.0 +/– 0.1 °C.
2. Set the Simulator to 20 °C. Adjust R2 on PCB1 until the left display (SKIN) reads 20.0 +/– 0.1 °C.
3. Repeat steps 1 and 2 to ensure proper settings. Readjust if necessary.
4. Set the Simulator to AIR mode and 36.0 °C.
5. On PCB1 adjust R18 until the right display (AIR) reads 36 +/– 0.1 °C.
6. Set the Simulator to 20 °C. On PCB1 adjust R13 until the right display (AIR) reads 20+/– 0.1 °C.
7. Repeat steps 5 and 6 to ensure proper settings. Readjust if necessary.

5.2.5 PCB2 – MODEL C200

TEST SETUP

1. Connect the Simulator to the AUXILIARY PROBE jack on the Side Panel of the Controller. Connect the ac line cord through a variac and turn on the unit. Set the variac as follows: 120 +/–2V~ (110/120V Models); 240 +/– 2V~ (220/240V Models); 100 +/– 2V~ (100V Models).
2. On the Controller, set the SET TEMP °C switch to 36.0 °C.
3. On the Simulator, set the MODE switch to AIR and the TEMP switch to 36 °C. Refer to Figure 5.3 for location of test points and adjustments.

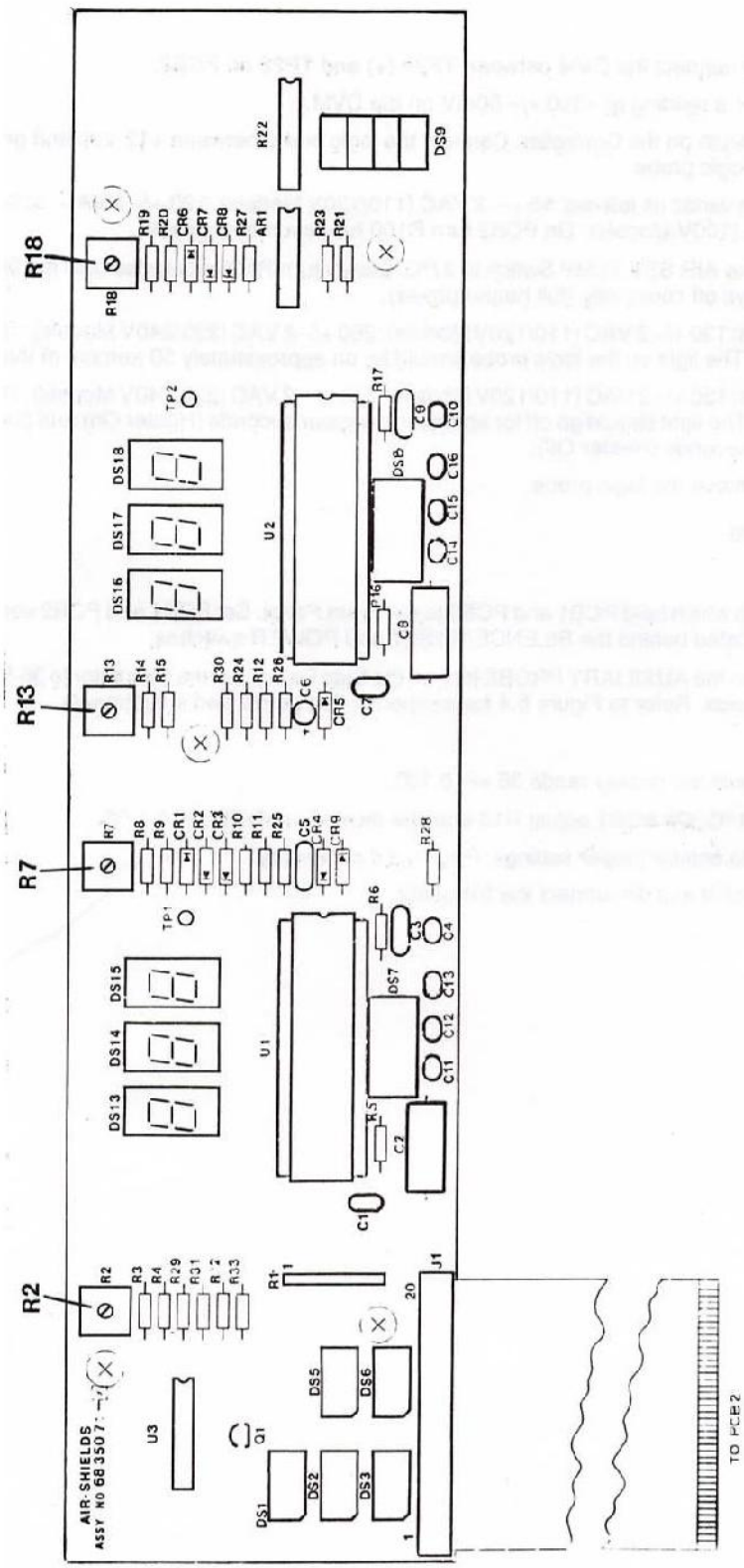

FIGURE 5.2 PCB1 (MODEL C100), LOCATION OF TEST POINTS AND ADJUSTMENTS

PROCEDURE

1. Refer to Figure 5.3 and connect the DVM between TP20 (+) and TP22 on PCB2.
2. Adjust R35 on PCB2 for a reading of –350 +/– 50mV on the DVM.
3. Turn off the POWER switch on the Controller. Connect the logic probe between +12 Vdc and ground. Monitor TP15 with the logic probe.
4. Turn the unit on. Set the variac as follows: 95 +/– 2 VAC (110/120V Models); 190 +/– 2 VAC (220/240V Models); 80 +/– 2 VAC (100V Models). On PCB2 turn R100 fully counterclockwise.
5. On the Controller, set the AIR SET TEMP Switch to 37°C. Slowly turn R100 clockwise until the light on the logic probe just stays off constantly (full heater power).

5a. Set the variac as follows: 130 +/– 2 VAC (110/120V Models); 260 +/– 2 VAC (220/240V Models); 108 +/– 2 VAC (100V Models). The light on the logic probe should be on approximately 50 percent of the time.

6. Set the variac as follows: 120 +/– 2 VAC (110/120V Models); 240 +/– 2 VAC (220/240V Models); 100 +/– 2 VAC (100V Models). The light should go off for approximately four seconds (Heater On) and come on for approximately two seconds (Heater Off).
7. Turn off the power. Remove the logic probe.

5.2.6 PCB1 – MODEL C200

TEST SETUP

1. Remove the five screws which hold PCB1 and PCB2 to the Front Panel. Set PCB1 and PCB2 vertically behind the brackets located behind the SILENCE/RESET and POWER switches.
2. Connect the Simulator to the AUXILIARY PROBE jack on the Side Panel. Set the Simulator to 36 °C. Set the Simulator to AIR mode. Refer to Figure 5.4 for location of test points and adjustments.

PROCEDURE

1. On PCB1 adjust R18 until the display reads 36 +/– 0.1°C.
2. Set the Simulator to 20 °C. On PCB1 adjust R13 until the display reads 20 +/– 0.1 °C.
3. Repeat steps 1 and 2 to ensure proper settings. Readjust if necessary.
4. Reassemble the Controller and disconnect the Simulator.